

Dietary proteins and blood pressure regulation

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Valorization

MAIN GOAL OF VALORIZATION

Valorization is defined by the National Valorization Committee as “the process of creating value from knowledge, by making knowledge suitable and/or available for social (and/or economic) use and by making knowledge suitable for translation into competitive products, services, processes and new commercial activities”. In other words: “How can the finding that 4 weeks consumption of a protein mix lowers blood pressure (BP) be translated into practice?” The first question that needs to be addressed is the societal relevance of this finding. The next question is what extra knowledge do we need, before this finding can be translated into practice? Followed by addressing how this knowledge, when sufficient, can be translated into practice.

SOCIETAL AND ECONOMIC RELEVANCE

Increased BP is an important risk factor, which frequently goes together with other disease risk factors like obesity and hyperinsulinemia in the metabolic syndrome. The metabolic syndrome often leads to cardiovascular diseases (CVD) or type 2 diabetes (1). In a randomized controlled trial comparing effects of 4 weeks of increased protein intake (3 x 20 g per day) with maltodextrin intake (3 x 20 g per day) on BP, we found a decrease of 4.9 mmHg systolic blood pressure (SBP) after 4 weeks on a high protein diet (**chapter 3**). A decrease of this magnitude at the population level would lead to a 14% risk reduction of stroke mortality and 9% risk reduction in coronary heart disease mortality (2). Population wide reductions of diastolic blood pressure (DBP) could also reduce the risk of stroke, transient ischemic attacks, and coronary heart disease (2). This would have a great societal impact, since CVD are the second largest cause of death in the Netherlands (3). This would also reduce medical costs of surgery, revalidation, and medication. Reduction of BP by means of a healthy lifestyle could also postpone the need for antihypertensive medication use, which also saves medication costs.

IS CURRENT KNOWLEDGE SUFFICIENT TO IMPLEMENT A DIETARY ADVICE?

Before a dietary advice can be implemented, it is of importance to assess the risk-to-benefit ratio for specific target groups. Regarding BP the benefits of increased protein intake have been shown for mixes of dietary proteins, protein-rich diets and for several protein-rich food substances. Dietary proteins also improve adiposity and triglyceride levels, but small beneficial effects need to be evaluated against potential harms (4). It is still not clear whether all types of proteins and protein-rich foods are beneficial for health. Some types of proteins may have adverse effects on BP, for instance via adverse effects on kidney function. In addition, other risks of protein consumption also need to be

considered, like the potentially increased risk of cancer reported recently (5). Therefore, the time may not be right yet for the implementation of a general dietary advice to increase protein intake. Further research is necessary and future research should concentrate on long-term effects (beyond 4 weeks) of dietary proteins on BP and other health issues. Although randomized trials do not suggest a difference in the BP-lowering effects of plant and animal proteins, animal proteins are suggested to increase the risk of cancer in individuals between the ages of 50-65 years old (5). Therefore, plant proteins may be the most promising proteins regarding risk-to-benefit ratios. Increasing the intake of plant proteins is also more attractive from a economical and ecological point of view, because animal proteins are more expensive to produce and production of animal proteins goes together with more environmental pollution. Because the risk of cancer from high protein intake differs between age-groups (5), it is of importance to investigate the risk-to-benefit ratios in different age groups. Different patient groups may also have different risk-to-benefit ratios for increased protein intake. For instance, individuals with impaired kidney function or a higher risk for impaired kidney function (like type 2 diabetics), could have an adverse risk-to-benefit ratio of increased protein intake compared to individuals without (an increased risk of) impaired renal function. Therefore, risk-to-benefit ratios need to be assessed for different types of populations. The development of biomarkers to identify the individuals who would benefit from the BP-lowering effect of dietary proteins would also be a nice approach. We did not find differences in biomarkers of endothelial dysfunction (ED) postprandially, whereas we did find that ED and pulse wave velocity were improved after 4 weeks on the high protein diet. Perhaps other markers, which we did not measure, are able to predict whether an individual would show an improvement in ED and BP in the long-term.

PARTIES THAT SHOULD BE INVOLVED IN NEW RESEARCH PROJECTS

Academia

Academia have a good insight into existing knowledge and with this knowledge they can come up with new studies, which add information to existing evidence. Academia have knowledge on physiological risks and benefits of certain foods for certain populations and they can translate current knowledge from scientific publications to choose the most promising product to test. Also, academia know how to plan a scientifically sound study design and academia have state-of-the-art facilities for conducting independent objective research. Academia are also experts in objectively publishing research findings in the academic world, which drives other research groups to use their expertise and facilities for further investigation to further broaden current knowledge.

Statisticians should also add to the research proposal to make sure that the study is designed in such a way that data can be analyzed in the best possible way.

Funding for the research can be obtained from industrial companies and/or from research organizations like the Hartstichting. It is important to keep valorization in mind when planning research.

Industry

The present research was a part of research project A-1003 funded by top institute food and nutrition (TIFN). TIFN is a public-private partnership of science, industry and government conducting strategic research in food and nutrition. Such collaboration is essential for optimal valorization of research. Research scientists are supposed to be the objective party bringing the knowledge to conduct a promising study, while the industry brings in practical use of research and translation into products that can be marketed. For instance, researcher may be very interested to find out how a certain bioactive food component reduces BP, whereas this particular food component may not be of interest for industry because of the costs to isolate this component.

Industries keep an eye on the innovative and practical parts of the research. Is the product already patented? Can we patent it in the future if proven beneficial? Is the product we choose to test easy to obtain? What are the costs? Can the product be produced in a tasty edible form? Do they weigh up against the health/economical benefits?

Health care specialists

Disciplines like dietitians and general practitioners should also be involved in the development of new research projects. These health care specialists have expertise on how to motivate participants to take the test product according to the prescription. They also know what challenges are to be expected when supplements are used as opposed to whole foods. And these disciplines have experience to design the research in such a way that dietary compliance is optimized. Their experience is also valuable to design the research within the boundaries of daily practice. Strictly controlled diets with researchers providing food are a good way to proof a principle but are too intensive to be feasible for daily practice. Because the BP-lowering effect of dietary proteins has been shown many times, now it is time to conduct research controlled within the boundaries of daily practitioners. In this way, results can be generalized better and the step towards implementation of a dietary advice is also smaller.

TARGET GROUPS FOR IMPLEMENTATION OF AN INCREASED PROTEIN DIET

If follow-up studies show that the risk-to-benefit ratio of increased intake of certain proteins is beneficial for the health of specific patient groups, the time is right to start with the implementation of a dietary advice. To make sure that knowledge obtained from our studies is put to good use, it is important to inform as many groups of stakeholders as possible to spread the knowledge. Several target groups are interested in our study results.

Patients

Individuals with elevated BP and patient organizations would be interested in our study results. Individuals with elevated BP could profit from an increased protein diet. Because studies are based on research populations, it is not certain that all individuals with elevated blood pressure would profit from a high protein diet. But those who are able to lower their BP may lower their risk for CVD. In addition, BP lowering medication might be reduced, which also reduces the burden of medication use and drug reactions. Patients could also have lower expenses because in the Netherlands everyone is obliged to pay for the first 350 euros of health care costs themselves. Some of our research participants were against the use of medication and were very interested in dietary approaches to reduce their BP.

Health care professionals

Evidence-based practice is an important part of health care practice these days. Because general practitioners, dietitians, life style coaches etcetera want the best for their patients/clients they would be interested in implementing a new dietary advice.

Industry and entrepreneurs

Companies would be interested in our research findings. For the present study, the finding that dietary protein lowers BP does not lead to a patent because dietary protein is freely available on the market. However, in the future health claims could be added to protein-rich products to convince consumers to buy these products. These health claims could also help health care professionals, like dietitians and general practitioners, providing dietary advice to individuals with elevated BP.

Media

Media reporting news on health care are also a target group that needs to be considered. The Maastricht University press-bureau for scientific communication can assist scientists in writing a scientifically sound press release to inform the media. Our paper in **chapter 3**

received media attention. Working together with a professional of media communication could have helped us with managing media attention and using the media efficiently for carrying out the main message from our research.

Policy makers

One target group is the Dutch Health Council, which is an independent scientific advisory organ who gives advice to the Dutch government on public health. Another important target group is the Dutch Food center, which informs the Dutch population on healthy nutrition. In addition, the European Society of Hypertension (ESH) and European Society of Cardiology (ESC) could be informed to implement a high protein diet in their guidelines for the treatment of hypertension.

APPROACH FOR IMPLEMENTATION OF AN INCREASED PROTEIN DIET

Create a solid dietary advice

A multidisciplinary approach is necessary to create a solid dietary advice for patients. Health care professionals have experience with advising dietary regimens and can contribute to finding the best way to successfully increase protein intake of patients/clients. Health sciences graduates in the field of health promotion can also advise on how to make an appealing and clear leaflet for patients and for health care professionals on the dietary advice. A contact number/email should be put on the leaflet to help patients and health care professionals when they have questions about the diet.

How to reach the target groups

Collaboration with authorities involved in providing dietary advice to consumers and health care professionals like the Dutch Food center. In addition, Information could also be provided to healthcare professionals at congresses and symposia, like “arts en voeding”, via occupational websites like www.nieuwsvoordietisten.nl, and via schools and education.

Large groups of people can be reached by showing up in public debates, television interviews, interviews for popular magazines read by target groups. Many magazines targeting men and women of different age groups also have a health column.

The most important thing is to not sit and wait until you are contacted. A communications professional should be assigned to manage information provision. This professional can identify the most important communication channels to start with and may also be a good spokes person to show up in the media.

To reach a greater audience scientific findings should be published in open access journals. But to reach a non-scientific public articles in national newspapers could be a better medium.

Social media are also an efficient way to reach many persons in a short time. Many companies nowadays have LinkedIn, Twitter and Facebook accounts with lots of followers.

Industrial products

Even though dietary proteins are commercially available, entrepreneurs may be interested in developing for instance a protein bar for lowering BP. But a health claim could also help to sell existing protein-rich products. If a protein-rich diet becomes hype perhaps the market had place for restaurants serving only protein-rich products.

Follow up of implementation

Health care professionals can also be involved in follow-up of dietary advises to monitor beneficial and adverse health effects in the long term. National research bureaus like central bureau of statistics (CBS) or the national institute for public health and environment (RIVM) could also help in monitoring health developments of patients in the longer term. If implementation is successful in the Netherlands, the advice could be extended by involving the World Health Organization.

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